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ABSTRACT

This manual, which describes the Department of Defense Dependent Schools' educational computing program, briefly identifies and explains the potential uses of computer technology and provides direction for the development of computer utilization among elementary and secondary schools throughout the geographically dispersed system. The first two sections list student objectives for computer literacy and computer science. Under computer literacy, objectives cover a broad range of activities at a beginning level, which are implemented through the math curriculum and reinforced through the use of computers in other curricular areas. For computer science, objectives address specialized topics relating to computers. The final two sections cover the support functions of computer education services and school administrative functions. Services in support of the entire school computer education program are outlined, including the implementation of computer-based instructional areas and support of the computer literacy and computer science programs, with emphasis on the role of the school computer coordinator. A 2-page glossary explains computer-related terms. (LMM)

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EDUCATIONAL COMPUTING:

SUPPORT FUNCTIONS AND

STUDENT OBJECTIVES

Department of Defense
Dependents Schools
DS Manual 2350.1
January 1982

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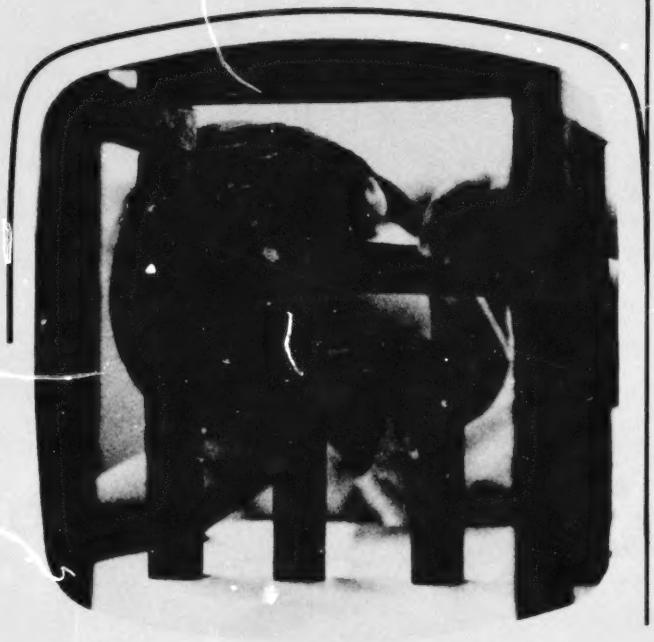


Preface

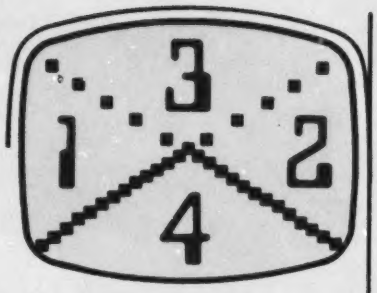
The Department of Defense Dependents Schools (DoDDS) educational computing program, described in this manual, includes a variety of potential school uses of computer technology.

Students will be able to study computers and how they work. Students and teachers will be able to use computers as a tool for learning in all curricular areas. Computers will also be used for local school administration and for support of the total school program.

Each of these potential uses contributes to the ability of the teacher to provide effective learning experiences and thereby meet the individual and collective needs of students.

This manual is intended to identify and explain the potential uses of computer technology, as well as to stimulate and provide direction for development of computer utilization among elementary and secondary schools throughout the geographically dispersed dependents' schools system.

Anthony Cardinale
Director



Introduction

Educational computing encompasses the total perceived integrated uses of computers in the schools from grades K-12. It is envisioned that implementation of these objectives and functions will evolve over a 3- to 5-year period. To identify and delineate these activities, student objectives and support functions are divided as follows:

Student Objectives

1 Computer Literacy The objectives in this section identify a broad range of activities at a beginning level, are implemented through the math curriculum, and are reinforced through the use of computers in other curricular areas.

2 Computer Science Students in this program are expected to deal with specialized topics relating to computers. This is implemented through the computer science curriculum.

Support Functions

3 Computer Education Services This section identifies functions in support of the entire school computer education program and includes implementation of computer-based instruction in all of the instructional areas. Computer education services also include support of the computer literacy and computer science programs.

4 School Administrative Support This function is to provide administrative support to the school.

Student Objectives

Numbering Code and Organization

The first digit of the numbering code for each statement refers to the GENERAL OBJECTIVE to which it relates. The second digit refers to the PROGRAM OBJECTIVE. The third digit identifies the INSTRUCTIONAL OBJECTIVE.

1.0 1.1 1.1.1

General Objectives

Program Objectives

Instructional Objectives

General and program objectives are included here for Computer Literacy and Computer Science. Instructional objectives in each area are inclusive, but can be further defined by enabling objectives as determined by the classroom teacher. Under each grade-level grouping, the letter "E" represents the suggested entry level. The letter "P" indicates the earliest level at which proficiency can be expected for most students.

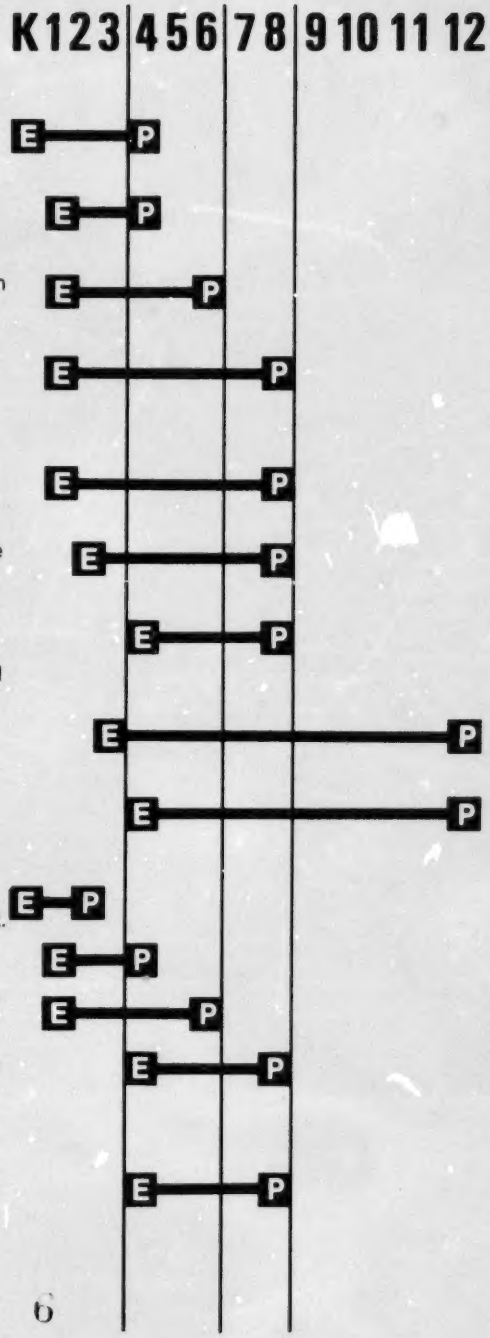
All objective statements should be preceded by the phrase "THE STUDENT WILL BE ABLE TO . . . ."

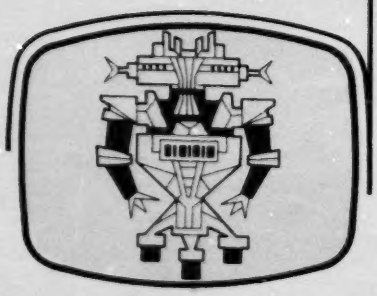
1.0 Computer Literacy

THE STUDENT WILL BE ABLE TO . . .

Demonstrate Understanding of the Capabilities, Applications, and Implications of Computer Technology

PROGRAM OBJECTIVES:	INSTRUCTIONAL OBJECTIVES:
1.1 Interact with a computer and/or other electronic devices.	**1.1.1** Demonstrate ability to operate a variety of devices which are based on electronic logic.
	1.1.2 Demonstrate ability to use a computer in the interactive mode.
	1.1.3 Independently select a program from the computer resource library.
	1.1.4 Recognize user errors associated with computer utilization.
1.2 Explain the functions and uses of a computer system.	**1.2.1** Use an appropriate vocabulary for communicating about computers.
	1.2.2 Distinguish between interactive mode and batch mode computer processing.
	1.2.3 Identify a computer system's major components such as input, memory, processing, and output.
	1.2.4 Recognize tasks for which computer utilization is appropriate.
	1.2.5 Describe the major historical developments in computing.
1.3 Utilize systematic processes in problem solving.	**1.3.1** Choose a logical sequence of steps needed to perform a task.
	1.3.2 Diagram the steps in solving a problem.
	1.3.3 Select the appropriate tool and procedure to solve a problem.
	1.3.4 Develop systematic procedures to perform useful tasks in areas such as social studies, business, science, and mathematics.
	1.3.5 Write simple programs to solve problems using a high-level language such as PILOT, LOGO, and BASIC.





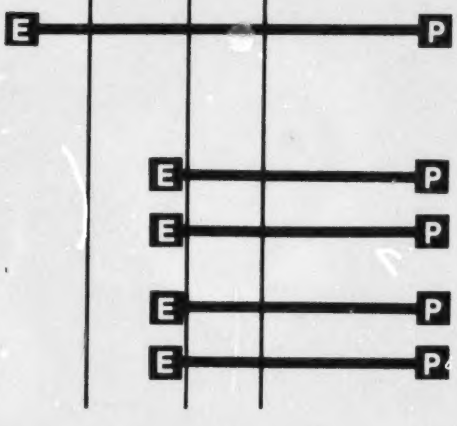
1.0

PROGRAM OBJECTIVES:

1.4 Appraise the impact of computer technology upon human life.

INSTRUCTIONAL OBJECTIVES:

K1 2 3 4 5 6 7 8 9 10 11 12



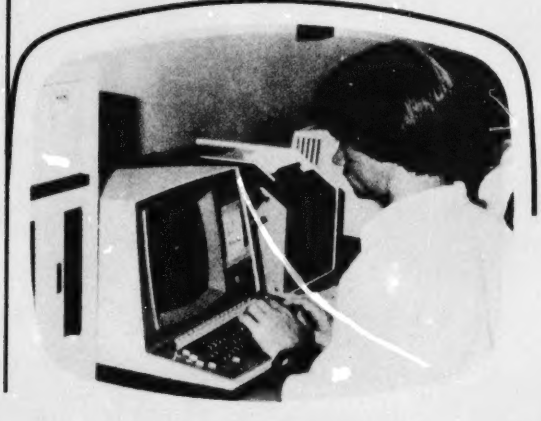
1.4.1 Identify specific uses of computers in fields such as medicine, law enforcement, industry, business, transportation, government, banking, and space exploration.

1.4.2 Compare computer-related occupations and careers.

1.4.3 Identify social and other non-technical factors which might restrict computer utilization.

1.4.4 Recognize the consequences of computer utilization.

1.4.5 Differentiate between responsible and irresponsible uses of computer technology.



2.0 Computer Science

THE STUDENT WILL BE ABLE TO . . .

Demonstrate Understandings of Computer Systems Including Software Development, the Design and Operation of Hardware, and the Use of Computer Systems in Solving Problems.

PROGRAM OBJECTIVES:

INSTRUCTIONAL OBJECTIVES:

7 8 | 9 10 11 12

2.1 Write structured and documented computer software.

2.1.1 Write well-organized BASIC programs which include the use of color, sound, and graphic statements. E — P

2.1.2 Write programs which demonstrate advanced programming techniques used to solve problems in business, scientific, or entertainment applications. E — P

2.1.3 Write programs in an additional high-level language such as PASCAL, COBOL, or FORTRAN. E — P

2.1.4 Write programs in a low-level language such as machine language or assembler. E — P

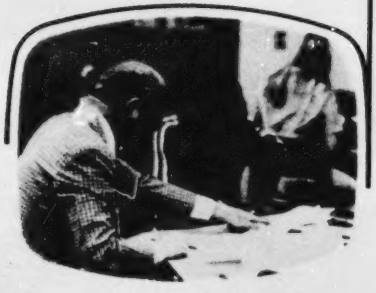
2.2 Demonstrate knowledge of the design and operation of computer hardware.

2.2.1 Demonstrate unassisted operation of at least two different configurations of computers and their peripherals. E — P

2.2.2 Use a special-purpose computer or computer-interfaced devices to monitor or control events by sensing temperature, light, sound, or other physical phenomena. E — P

2.2.3 Describe the computer's digital electronic circuitry in terms of binary arithmetic and logical operators. E — P

2.2.4 Perform vendor-authorized minor maintenance on the computer system. E — P



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PROGRAM OBJECTIVES:

2.3 Use computer systems in problem solving.

INSTRUCTIONAL OBJECTIVES:

		7	8	9	10	11	12
2.3.1	Use data processing utilities, including word processing and data base management, in problem solving.			E	—	—	P
2.3.2	Translate software from one language to another or to another version of the same language.				E	—	P
2.3.3	Analyze different solutions to the same problem.					E	— P

Support Functions

Numbering Code and Organization

The first digit of the numbering code refers to the GENERAL FUNCTION to which it relates. The second digit refers to the PROGRAM FUNCTION. The third digit identifies the SPECIFIC FUNCTION.

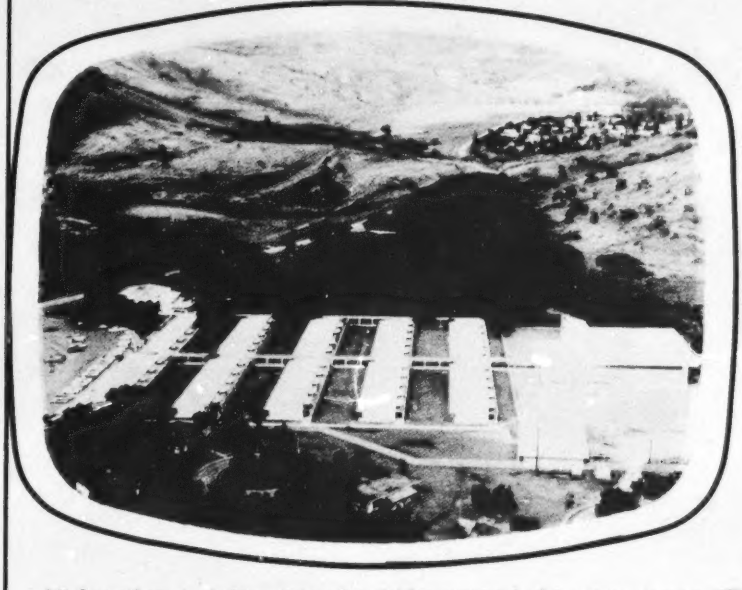
1.0 1.1 1.1.1

General Function

Program Function

Specific Function

Functional statements have equal value, and sequence does not represent priority. All are important. Specific functions are inclusive, but can be further divided into sub-functions which are performed.



All functional statements should be preceded by the phrase "THE SCHOOL COMPUTER COORDINATOR SHOULD . . . ."

3.0 Computer Education Services

THE SCHOOL COMPUTER COORDINATOR SHOULD . . .

Coordinate School Computer Activities Related to Computer-Based Instruction, Computer Literacy, and Computer Science for a School or Group of Schools.

3.1 Assess school classroom instructional needs.

- **3.1.1** Identify hardware and software requirements.
- **3.1.2** Survey appropriate instructional modes and potential levels of usage.
- **3.1.3** Forecast in-service requirements.
- **3.1.4** Provide regional coordinator and school personnel with assessment results and recommendations.

3.2 Advise school personnel of available hardware, software, and supplies which will support individual classroom needs.

- **3.2.1** Suggest material and software.
- **3.2.2** Recommend appropriate maintenance plans.
- **3.2.3** Maintain an inventory of computer equipment and available software.

3.3 Provide technical assistance through in-service and consultation.

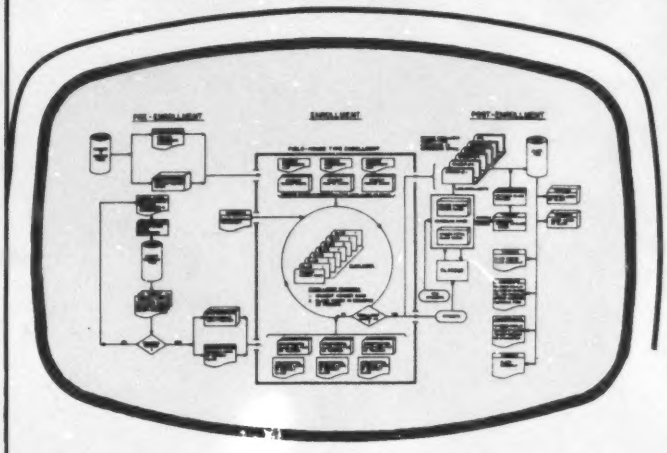
- **3.3.1** Orient the professional staff concerning classroom application of computers.
- **3.3.2** Conduct in-service training.
- **3.3.3** Help staff members develop plans for efficient computer utilization for instructional purposes.
- **3.3.4** Facilitate software development projects.

3.4 Act as a point of contact for school computer activities.

- **3.4.1** Maintain lines of communication between the regional coordinator and school personnel.
- **3.4.2** Maintain lines of communication with other school computer coordinators.
- **3.4.3** Develop a network of community contacts.
- **3.4.4** Provide local media with news items.

School Administrative Support

4.0



Coordinate School Computer Support Services for a School or Group of Schools.

THE SCHOOL COMPUTER COORDINATOR SHOULD . . .

4.1 Coordinate with school personnel in accomplishing computer-assisted STUDENT SERVICES tasks.

4.1.1 Facilitate collection and maintenance of school REGISTRATION information.

4.1.2 Provide computer assistance in the development of the school MASTER SCHEDULE.

4.1.3 Provide computer assistance in student SCHEDULING.

4.1.4 Provide computer assistance in the maintenance of student ATTENDANCE records.

4.1.5 Provide computer assistance in the production of student PROGRESS REPORTS.

4.1.6 Generate required SUMMARY REPORTS from student services data base.

4.2 Assist EDUCATION SUPPORT PERSONNEL in the utilization of computer technology to accomplish their program support functions.

4.2.1 Assist the MEDIA SPECIALIST in using computer resources to acquire, circulate, and maintain media materials and equipment in support of the instructional program.

4.2.2 Assist PUPIL PERSONNEL SERVICES staff in the utilization of computer technology to manage information either required by or generated in the performance of their support functions.

4.2.3 Assist SPECIAL EDUCATION personnel and other TEACHER SPECIALISTS in the identification of special students' needs and in the monitoring of these students' educational programs.

4.3 Provide assistance in support of the autdmated MANAGEMENT OF SCHOOL RESOURCES.

4.3.1 Assist with DoDDS PERSONNEL records management in the school.

4.3.2 Assist with DoDDS FINANCIAL records management in the school.

4.3.3 Assist with DoDDS LOGISTICS records management in the school.

4.3.4 Assist with DoDDS ADP management in the school.

4.4 Support program PLANNING, EVALUATION, and IN-SERVICE activities in the school.

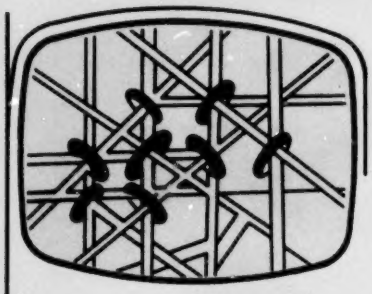
4.4.1 Support school activities related to the DoDDS Five-Year CURRICULUM DEVELOPMENT Plan.

4.4.2 Provide computer assistance in the measurement of STUDENT ACHIEVEMENT, the ASSESSMENT OF EDUCATIONAL PROGRAMS, and in the support of IN-SERVICE TRAINING activities.

4.4.3 Provide IN-SERVICE TRAINING in computer technology for education support personnel.

4.4.4 Provide computer assistance with SURVEY AND QUESTIONNAIRE DEVELOPMENT and analysis.

Glossary



ADP Management	The management of Automatic Data Processing which includes acquisition, utilization, and maintenance of computer equipment and software.
Assembler Language	A computer language in which combinations of alphabetic and numeric codes are used to represent machine language instructions.
BASIC	Beginner's All-Purpose Symbolic Instruction Code, a high-level interactive computer language designed for beginners. It is the most common language supplied with microcomputers.
Batch Mode	A method of using a computer in which programs process data without user interaction. Errors and output are not usually produced until the completion of a program or several programs.
Binary	A number system (Base 2) that uses only two digits, 0 and 1, to express all numeric values. The term also refers to physical or electronic devices having two states, such as on/off, left/right, etc.
COBOL	COmmon Business Oriented Language, a programming language designed specifically for business and data processing application.
Computer	An electronic device that accepts a set of instructions which it follows to accomplish a prescribed task.
Computer Based Instruction	The use of a computer in a variety of modes of instruction, such as drill and practice, tutorial exercises, simulations, problem solving, and information retrieval.
Computer Interface	A device that allows a computer to communicate with another piece of hardware.
Data	Any and all items of information (numbers, letters, symbols, facts, statements, etc.) which can be processed or generated by a computer.
Data Base Management	A system of organizing data in computer files for ease of entering data and retrieving information in useful ways.
Data Processing	Any procedure for receiving information (input) and produce a specific result (output).
Digital Electronic Circuitry	Electronic circuits which handle data in discrete or numeric form, usually in binary form, as in off-on, pulse, no-pulse situations.
Documented (Software)	An explanation of the software. This explanation generally includes the program's name, its purpose, its input and output requirements, its algorithms, its data structure, and its other critical and unique charcteristics.
Electronic Logic	Electronic circuits which are designed to allow computers to make decisions based on mathematical logic, such as AND, OR, NOT, GREATER THAN, etc.
FORTRAN	FORmula TRANslator, a high level computer programming language particularly suited for mathematically oriented computer applications. It is usually not interactive.
Hardware	Computer machinery, including any mechanical, electronic, or magnetic device which is a component of a computer system.

Input	Information to be transferred from an external source into a computer system.
Interactive Mode	A mode in which a computer can ask questions of the user and then take action based on the response.
Language (Computer)	A vocabulary and syntax which allows humans to write programs and communicate with computers.
Logical Operator	A symbol of logic such as AND, the logical product, OR, the logical sum, NOT, or the logical complement.
LOGO	An interactive computer language designed for ease of use and freedom from restrictions and particularly for student use in learning mathematical and problem-solving concepts.
Machine Language	A computer language with language statements written in numeric codes corresponding to hardware instructions.
Memory	An internal electronic component of a computer capable of retaining data.
Monitor	A television-like screen used by the computer to display information.
Output	Information produced by a computer system, usually on a screen or paper, but also in other media.
PASCAL	A computer language designed to facilitate the writing of programs in a structured and well-organized manner, resulting in efficient, easily maintained programs.
Peripherals	Computer-related hardware other than the processing unit, and usually packaged separately but connected to the processing unit, such as printers or disk drives.
PILOT	Programmed Inquiry Learning Or Teaching, an interactive computer language designed to be particularly useful in writing programs for teaching which include dialogue with students and branching in instructional sequences.
Program	A set of instructions, written in a computer language, which causes a computer to accomplish a task.
Software	Computer programs of all kinds.
Structured (Software)	Programs written with a specific organization in an effort to make them more efficient, readable, and maintainable.
Statement	An instruction to the computer to perform one or more operations.
User Error	An error in processing caused by an error committed by the user.
Word Processing	A computer-based system including hardware and software, which is designed for ease of entering, editing, or otherwise manipulating text, such as in producing correspondence, reports, lists, etc.